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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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July 29, 2002

TO: Internal File

THRU: Priscilla Burton, Senior Reclamation Specialist; Co-team Lead; and
Dana Dean, P.E., Reclamation Specialist II, Co-team Lead

FROM: James D. Smith, Senior Reclamation Specialist, Hydrogeology JDS

RE: Lila Canyon Extension Permit Application Package (PAP), UtahAmerican Energy, Inc., Horse Canyon Mine, C/007/013 PM02B-1

SUMMARY:

UtahAmerican Energy, Inc.(UEI) has proposed to develop new surface facilities near the mouth of Lila Canyon in order to mine coal in six federal leases. The federal leases are contained within the "North Block Logical Mining Unit" as approved by the United States Bureau of Land Management (BLM) January 1, 1994.

The Lila Canyon Extension Permit Application Package (PAP) has been submitted and reviewed as an extension to the existing Horse Canyon Mine Mining and Reclamation Plan (MRP). The current Horse Canyon Mine permit area contains approximately 1330 acres, and the Lila Canyon extension contains approximately 4700 acres for a total of 6030 acres. The current disturbed area is about 74 acres, and approximately 35 acres would be disturbed by the new surface facilities.

The Division first received the Lila Canyon Extension PAP on February 11, 2002. The Division determined the application to be administratively complete on February 25, 2002. An initial review of technical adequacy was sent to UEI on March 26, 2002, and the response from UEI was received on April 24, 2002.

In response to the public notice published in the Sun Advocate in February and March 2002, a number of comments were received from the public, and an informal conference was requested by the Southern Utah Wilderness Alliance (SUWA). The informal conference was held May 21, 2002, and the comments and concerns expressed by SUWA and other members of the public have been considered in the preparation of this Technical Analysis (TA).

TECHNICAL ANALYSIS:

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The PAP is for an extension to an existing permit, but it is formatted as a stand-alone document, to all appearances it is a separate mine and mine permit from the Horse Canyon Mine. There are baseline data and other information in the Horse Canyon Mine MRP that are relevant to the Lila Canyon Extension, but these are not reproduced in the Lila Canyon PAP nor are they adequately referenced. The permittee needs to integrate the existing MRP and the Lila Canyon Extension PAP into a single, concise document.

Findings:

R645-301-121.300, The permittee needs to integrate the existing MRP and the Lila Canyon Extension PAP into a single, concise document.

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

Resource maps and plans and site specific information in the Lila Canyon Extension PAP are based on, among other sources, the old PAP for the Kaiser South Lease area. The Permittee has a copy of the Kaiser South Lease PAP. Relevant data from the Kaiser South Lease PAP should be incorporated into the Lila Extension PAP, be used in determining the PHC, and be available to the Division to use in preparing the TA and CHIA.

SUWA has raised concerns that the terminology regarding coal mine waste, slope rock, and underground development waste is confusing. The terminology is explained in Sections 536.300 and 537.210 and in Appendix 5-7 of the PAP. Nevertheless, the Permittee should determine a single term and use it consistently throughout the PAP to avoid confusion.

SUWA has raised concerns that the location and extent of coal mine waste is not clear. Section 536.300 states there is unlikely to be any coal in the slope rock material; Section 537.200 discusses treatment of slope rock material containing coal. This is not necessarily contradictory,

but it is confusing. Section 537.200 isn't clear on the distinction between low areas to be used as pads and the refuse storage area (sic. plural "pads" – there is only one pad shown on Figure 1 of App. 5-7 and Plate 5-2). Again, not contradictory, but confusing.

SUWA has raised concerns that the treatment of coal mine waste is not clear. Section 536.600 isn't clear as to how and why slope rock material placed in the pads will be spread out and graded; this leaves the impression it will not be buried as part of the refuse pile reclamation but rather spread across the site. Section 537.200 clarifies this, but 536.600 should be clear also. Section 528.320 distinguishes the coal-free slope rock material used as structural fill for the shop – warehouse from the material that will go into an apparently separate refuse pile. The PAP should make it clear that these two areas are adjacent and conjoining and will be treated as one area or structure, especially during reclamation.

Section 520 – Refuse Piles – gives the refuse disposal pile capacity as 150,000 tons. Numbers used for rock density and swell factor can affect the conversion to cubic yards, but this number seems to indicate roughly 50% more material than the refuse pile design in App. 5-7.

Findings:

R645-301-121.200, A single term for coal mine waste, slope rock material, underground development waste, and any other material that is to be placed in the refuse pile which could be used consistently throughout the PAP would probably eliminate a lot of confusion as to the source, handling, and disposal of these materials.

R645-301-121.200, In Section 537.200, the distinction, or similarity, between low areas to be used as pads and the refuse storage area (sic. plural "pads" – there is only one pad shown on Figure 1 of App. 5-7 and Plate 5-2) is confusing and needs clarification.

R645-301-121.200, Sections 536.300 and 537.200 might appear contradictory in stating that there is unlikely to be any coal in the slope rock material, but treatment is planned for slope rock material containing coal. The two sections need to be consistent with each other.

R645-301-121.200, Section 536.600 isn't clear as to how and why slope rock material placed in the pads will be spread out and graded; this leaves the impression it will not be buried as part of the refuse pile reclamation but rather spread across the site. Section 537.200 clarifies this, but 536.600 should be clear also.

R645-301-121.200, Section 528.320 distinguishes the coal-free slope rock material used as structural fill for the shop – warehouse from the material that will go into an apparently separate refuse pile. The text should make it clear that these two areas are adjacent and conjoining and will be treated as one area or structure, especially during reclamation.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.

Analysis:

The closest weather station to the Lila Canyon Lease is the Sunnyside, Utah National Weather Service station, located roughly 6 miles north of and at a similar altitude as the Horse – Lila area. Information in Table 7-1A in Section 724.400 was downloaded from the Western Regional Climate Center. Based on relatively close proximity and similar locations on the west exposure of the Book Cliffs, the Permittee will use data from this station to verify precipitation amounts and other weather conditions for the Lila Canyon Project.

Information on average seasonal precipitation, average direction and velocity of winds, and seasonal temperature ranges that is representative of the permit and adjacent areas is presented in the PAP. Monthly and annual temperature and precipitation data for May 1958 to July 1988 are summarized in Table 7-1A. Average annual precipitation was 13.69 inches annually, and average total snowfall was 36.5 inches. Prevailing winds as reported in Section 742.412 are from west to east at a speed of 2.7 knots (3.1 mph).

Findings:

Climatological Resource Information is adequate to meet the requirements of this section of the Coal Mining Rules.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

The Permittee makes reference to the Lila Canyon Mine Permit Area (LMPA) throughout Chapter 6. The Division understands this action to be an extension to the Horse Canyon Mine permit, not a separate permit. The Permittee needs to use clear and consistent language in describing this submittal.

Geologic information includes a description of the geology of the proposed permit and adjacent areas down to and including the stratum immediately below the lowest coal seam to be mined. The coal seams and adjacent strata include a saturated zone that will almost undoubtedly be intercepted by mining. Geology influences the occurrence, availability, movement, quantity,

and quality of potentially impacted surface and ground water.

Local, perched bedrock and alluvial aquifers in Little Park Wash and along Patmos Ridge are separated from the saturated zone by a thick section of low permeability strata. These aquifers support small discharges from seeps and springs scattered across ground-water emergence zones and located mostly in the bottoms of various small drainages.

The plan includes geologic information in sufficient detail to assist in determining the PHC of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface- and ground-water monitoring is necessary, and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. Resource maps and plans and site specific information are based on published geologic information, permit plans of the adjacent Sunnyside and South Lease areas, and exploration and drilling records of Kaiser Steel, U. S. Steel Corporation, and Intermountain Power Agency (IPA)..

SUWA has raised concerns that there is not sufficient resource information to allow determination of the PHC. In the informal conference, SUWA expressed particular concern that there is not sufficient resource information for Range Creek drainage to evaluate the potential for adverse impacts.

The Division has determined that it is reasonable not to include the Range Creek drainage in the PHC determination because adverse impacts to resources in Range Creek drainage are not reasonably expected. However, information and discussion providing a foundation for this position are not explicit in the PAP. To clarify for the public why Range Creek drainage will not be adversely impacted, the Division is requiring that the Permittee augment geologic and other resource information in the PAP to include the Range Creek drainage and include an evaluation of potential adverse impacts to the Range Creek drainage in the determination of the PHC.

Seeps have recently been found in a deeply incised canyon located at the southwest corner of the Lila Canyon Extension. Geologic information for this area appears adequate, even though additional information on hydrologic and other resources in this and other incised canyons along the Book Cliffs escarpment might be needed to determine the PHC.

Bore holes S-1 through S-23 were drilled between 1948 and 1975. S-24 through S-32 were drilled in 1980 and 1981. In 1993 and 1994, IPA-1, IPA-2, and IPA-3 were drilled. IPA-1, IPA-2, and IPA-3 were completed as piezometers in 1994. Copies of bore-hole logs for IPA-1, IPA-2, IPA-3, S-14, S-27, and S-32 are in Appendix 6-1: logs for the other bore-holes are confidential and not available to the public. The bore-hole logs show lithologic characteristics, including physical properties and thickness of each stratum that may be impacted. In addition to the bore holes, coal seams and adjacent strata were measured at seventeen outcrop locations in 1974 and 1975. Lithology and thickness of the coal seams and adjacent strata, based on the bore holes and measured out-crop sections, are shown on Plate 6-5. Locations of the bore-holes and outcrop measurements are on Plate 6-2.

Acid- and Toxic-forming Materials

SUWA has raised concerns that analyses for acid- and toxic-forming materials in the strata above and below the coal seam to be mined have not been done. Because the strata above the Sunnyside Seam - the coal seam to be mined - will not be removed, the Coal Mining Rules require that samples be collected and analyzed from test borings, drill cores, or fresh outcrops (R645-301-624.200).

Strata immediately above and below the Sunnyside Seam were sampled in bore-holes S-24 and S-25, and results of analyses for potentially acid- or toxic-forming materials are in Appendix 6-2.

Planned mining will leave a roof and floor of coal, so the results of proximate and ash analyses of floor and roof material from IPA-1, IPA-2 (roof only), and IPA-3 in Appendix 6-2 are pertinent to the requirement for analysis for acid- and toxic-forming materials. There are also proximate, ultimate, sulphur (total and pyritic), ash, and several other analyses for "middle" coal samples from the three IPA bore holes. Pyritic sulfur (dry basis) ranged from 0.10 percent to 0.48 percent (Appendix 6-2).

Drill-logs in Appendix 6-1 note that pyrite was visible in many cutting or core samples, indicating potential acid- and toxic-forming materials in the strata above and below the Sunnyside Seam. The PAP makes no mention of these observations of pyrite: a summary of the information on these logs on the occurrence of pyrite in strata above and beneath the Sunnyside Seam is needed.

In a letter dated April 22, 2002, UEI requested exemption from R645-301-624.320. A copy of the letter is included in Appendix 6-2. The requested exemption is based on the following:

- a statement from the BLM's Environmental Analysis for lease U-32083 that there is no history of problems with acid- or toxic-forming materials at the nearby Sunnyside Mine, which operated for over 80 years;
- analyses from bore-holes S-24 and S-25 located two miles south of the Lila Canyon Extension permit area provide the required information on the strata that will be encountered during construction and operation of the Horse - Lila Canyon Mine;
- all material brought from the mine during construction and operation will be treated by burial as though it is acid- or toxic-forming; and
- coal-mine waste brought to the surface by mine construction and operation, including slope-rock underground development waste, will be tested for acid- or toxic-forming potential before burial.

Although it is true that there have been no problems with acid- or toxic-forming materials at the nearby Sunnyside Mine, acidic slurry-pond water carrying iron and other minerals seeped from the base of a refuse pile. The environment in the receiving channel raised the pH and

reduced the mineral load. Even though there were no offsite problems or impacts because of the buffering environment, the potential for acid and toxic mine drainage clearly exists in coals and waste materials in the Book Cliffs Coal Field.

The Lila Canyon Extension refuse pile is designed to handle and bury coal mine waste so as to minimize infiltration of water into the pile, to minimize the formation of acid or toxic drainage, and to minimize acid, toxic, or other harmful infiltration to ground-water and drainage or discharge to surface-water. Based on the design of the refuse pile; the reclamation plan; and the geology, hydrology and climate of the area; the Division has found that the probability of acid- or toxic-impacts from the materials to be placed in the refuse pile is small.

Nevertheless, the Permittee has committed to periodic sampling of the materials to be placed in the refuse pile as a further precaution. Samples will be collected and analyzed five times during construction of the rock-slope tunnels and from every 6,000 tons of waste rock placed on the refuse pile during mine operation: parameters are in Table 2 of Appendix 5-7. The reclamation plan specifies 4 feet of subsoil and topsoil will be placed over the refuse pile. The slope-rock underground development waste used to build the pads will be left in place for final reclamation and buried with 4 feet of subsoil and topsoil (Chapters 2, 5, and 7, and Appendix 5-7).

Because the Permittee uses the Sunnyside Mine as an example of why there is no need to perform further analysis of samples from test borings or cores for acid- and toxic-forming materials, the PAP needs to better or more clearly and concisely explain how the handling and disposal of coal mine waste at the Lila Canyon Extension is designed to avoid acid- and toxic-drainage such as occurred at the base of the Sunnyside Mine refuse pile.

As mining proceeds, materials overlying and underlying the coal seam can be exposed to water and oxygen underground, within the mine, and there is some potential to generate acid or toxic products. Rocks of the Mesaverde Group are carbonaceous, so persistence of acids and related toxins in water in the mine and adjacent strata is unlikely: the analyses from bore-holes S-24 and S-25 show acid-base potentials from all analyzed zones is greater than –5 tons CaCO3/1,000 tons material. The mine is designed so there will be no natural discharge or drainage from the portals. Discharge pumped from the mine will be subject to federal and state water-quality standards under the UPDES permit, and the discharge will be more thoroughly analyzed quarterly under the proposed operational monitoring plan in the PAP. Adverse impacts, and particularly material damage, from formation of acid or toxic water within the mine are unlikely.

As authorized under R645-301-626, the Division is waiving further analyses of samples from test borings or cores for acid- and toxic-forming materials in the strata immediately above and below the coal seam, although some additional discussion is being required to clarify the record in the PAP.

Engineering Properties

Engineering properties of the strata immediately above and below the coal seam to be mined are listed in Table 6-6. Data are based on core samples from bore holes S-18 and S-22.

Bore Holes

S-32 was drilled in 1981 in SE1/4SW1/4 Sec. 6, T. 17 S., R. 15 E., south of the Lila Canyon Extension area, and completed as a piezometer in the lower Grassy Member and Upper Sunnyside Seam of the Blackhawk Formation. The Permittee has included the drill-log, a Chronology of Development, and Water Pump Tests and Samples in Appendix 6-1. At least four water level measurements and one suite of water-quality analyses were done at S-32 in 1981 and 1982, but there is no information on the current condition of S-32 in the PAP.

IPA-1, IPA-2, and IPA-3 were completed as piezometers in 1994. Water-levels were measured from 1994 through 1996, and the Permittee resumed measurements in 2000.

The unnamed boring that the Permittee intends to use as a water-supply well (identified by the Division as the Horse Canyon Well), and the Minerals Development Corporation (MDC) Well (Plate 7-1) were bored in Horse Canyon to monitor water in the alluvium (Section 6.5.1). Kaiser Steel installed three piezometers, A-26, A-28, and A-31, which are no longer accessible, in the alluvium of Little Park Wash. The PAP briefly mentions A-26 and A-31 on page 12 (Chapter 7), but there are no hydrologic or geologic data from these piezometers in the PAP. The Kaiser South Lease PAP should be checked for further information on these piezometers.

Fluid levels were reported for several bore-holes. In some cases, the fluid reported in bore-holes appears to have been drilling fluid rather than ground water: bore-hole S-26 was completed as a piezometer in August 1980 but was dry within a month of completion and was subsequently cemented to the surface.

Stratigraphy

Stratigraphy of the Blackhawk Formation is described on pages 9 – 11 of Chapter 6. The Sunnyside Member, which is dominantly sandstone, includes the Upper and Lower Sunnyside Coal Seams, with the Grassy Sandstone above the coals and the Sunnyside Sandstone beneath them. The Horse Canyon Mine operated in the Lower Sunnyside Seam, which is also the seam that is planned to be mined in the Lila Canyon Extension.

Saturated Strata

A large section of the Horse Canyon Mine, including the Geneva exploration tunnel and the rotary dump, are below the water level indicated in the IPA piezometers. The PAP reports that, generally, underground flows from rock slopes and gob areas into the Horse Canyon Mine were small. Only when the mine intercepted the Sunnyside Fault in deeper, down-dip areas was significant water encountered. Prior to suspending operations, the mine pumped water from the

workings near the Sunnyside Fault to keep them from flooding. Some of the water was used for mine operations, the rest was discharged intermittently to the surface.

The PHC in Appendix 7-3 refers to data published by Balsley in 1981 that indicate the Sunnyside Sandstone beneath the coal is capable of transmitting water. The PAP states on page 11 (Chapter 6) that the Sunnyside Sandstone is known to transmit groundwater in the Sunnyside area. It also states that the portion which underlies the Lower Seam is "occasionally considered to be a potential aquifer"; the basis of this consideration appears to be the ability of this unit to transmit ground water in the Sunnyside area, but this is not clear. The statement itself is unclear and confusing, in particular the meaning of "occasionally considered to be a potential aquifer" in this context. The permeability values of Balsley that are referred to in the PHC should be incorporated into the PAP.

Much of the Horse Canyon Mine is below the potentiometric surface indicated by the IPA piezometers and the car-dump sump, but water entered the Horse Canyon Mine in large amounts only where the Sunnyside Fault was intercepted in deeper, down-dip areas. The PAP states that no ground water entered the Geneva – Horse Canyon Mine from the underlying sandstones, and the floor under the Sunnyside Seam in the Horse Canyon Mine is described as containing both sandstone and shale (Page-11, Chapter 6), with the implication that the shale could have impeded ground-water flow. There are other possible explanations for the dryness of the Horse Canyon Mine that are not discussed in the PAP, such as, but by no means limited to:

- the Sunnyside Sandstone was not saturated or lacked sufficient hydraulic conductivity to transmit water;
- most of the mine simply was not deep enough to encounter a saturated zone;
- there was unreported leakage where the mine was deep enough to encounter a saturated zone; or
- the east-west faults isolated the mine from saturated zones.

Minor water inflows from the exploration entries is anticipated (Page-40, Chapter 6); this reference to exploration entries is unclear and confusing because there are no exploration entries mentioned in the Lila Canyon Extension PAP. The PHC states that the (Geneva) exploration tunnel is flooded, that it will be intercepted by mining operations in the Lila Canyon Extension, and the water will need to be pumped from the mine; the source of the information on the exploration tunnel and the water in it is not given in the PAP and is not discussed with resource information.

The Permittee needs to more adequately discuss the reasons why water from the saturated strata did not enter the Horse Canyon Mine and why similar, relatively dry conditions are anticipated in the Lila Canyon Extension.

Saturated strata in the lower Blackhawk Formation are separated from the perched zones in the upper Wasatch Group by upper Blackhawk, Price River and undifferentiated North Horn-Flagstaff Formations, strata that contain approximately 80 percent clays, shales, siltstones, and

mudstones (Hydrology, Page-7). Plastic or swelling clays that can seal faults and fractures and inhibit lateral and vertical flow of ground water are abundant (Hydrology, Page-8). The PAP does not identify the sources of the information on percentage of fine-grained sediments in the stratigraphic column and on swelling clays.

Structure

The Sunnyside Fault, other faults, the elevation of the Horse Canyon Mine workings – in particular where the Sunnyside Fault was encountered and water flowed into the Horse Canyon Mine, and other potentiometric, geologic, and hydrologic information relevant to understanding the ground water in the saturated strata of the Blackhawk Formation are not adequately discussed in relation to each other and the proposed Lila Canyon Extension mine and are not shown together on a single map, drawing, plan, or cross section.

The coal seam crops out at an elevation of approximately 6,500 feet in the vicinity of the rock-slope tunnels. The plan indicates the tunnels will intercept the coal seam at approximately 6,300 feet (Appendix 8-2 - Figure 7-1).

Underground mining always has a potential for impacting surface water, ground water, and other surface resources. The Permittee states in Section 721 that subsidence effects are expected to be minimal due to the amount of cover and massive rock strata between the mining and the surface. Coal-seam elevations determined from bore holes are on Plate 6-4 - Cover and Structure Map. Geologic information is sufficient to assist in preparing the subsidence control plan.

Faults

SUWA has raised concerns that effects of faults on movement of ground water is ignored, especially in the regional aquifer. The PAP contains a description of regional geology and hydrology, including faults and their interaction with ground water. The PAP states small faults in the Horse Canyon Mine had little effect on ground water. The Sunnyside fault is not anticipated in the Lila Extension.

Fault locations on Plates 6-1 and 6-2 are based on previous mapping, exposures at the outcrop, fault interceptions in the Horse Canyon Mine and Geneva exploration tunnel, and information from drilling. The PAP contains inconsistent, contradictory, or unsubstantiated statements concerning faults and the relationship of faults to ground water. The PAP states on Page-26 of Chapter 6 that vertical displacements of faults range from 15 feet to more than 275 feet with displacement diminishing toward the east, and on Page-27 that vertical displacements as long as 205 feet have been measured at the outcrop in these major faults: Plate 6-2 shows displacement of 295 feet on the Williams Draw fault at the outcrop. The PAP states on Page-27 that the Entry Fault is offset 50 feet in the central part of the lease, but offset may disappear before reaching the outcrop: Plate 6-2 shows 50 feet of offset on this fault at the outcrop. Information on faults needs to be clarified in the PAP.

Faults may affect flow, direction, and magnitude of both lateral and vertical flows (Page 8, Chapter 7). Subsurface water inflow associated with fault or fracture systems are possible; however, this potential is not expected to be significant in the Lila Canyon Extension (Page-40, Chapter 6). The reasons inflow from fractures is expected to be insignificant needs to be explained.

As mining progresses down dip, localized fracture systems and faults may contain substantial water. This water is thought to be in place with little or no recharge (Page-41, Chapter 6). The reasons this water is thought to be in place with little or no recharge need to be explained. The statement on page 40 that the water inflow from fractures is expected to be insignificant and the statement on page 41 that faults may contain substantial water are contradictory.

En-echelon faulting or fracturing near the major displacements is common in the Geneva Mine, particularly in the transverse fault systems. Roof falls have been abnormally high in these areas, even though the strata indicate competent roof rock. These failures may be aggravated by water accumulation known to exist in the faults (Page-28, Chapter 6). The sources for this information are not identified.

Findings:

R645-301-624.100, 121.200, (1) The Permittee needs to clarify or resolve inconsistent, contradictory, or unsubstantiated statements in the PAP concerning faults and the relationship of faults to ground water. (2) The PAP states on page 26 of Chapter 6 that vertical displacements of faults range from 15 feet to more than 275 feet with displacement diminishing toward the east, and on page 27 that vertical displacements as long as 205 feet have been measured at the outcrop in these major faults: Plate 6-2 shows displacement of 295 feet on the Williams Draw fault at the outcrop. The PAP states on page 27 that the Entry Fault is offset 50 feet in the central part of the lease, but offset may disappear before reaching the outcrop: Plate 6-2 shows 50 feet of offset on this fault at the outcrop. The Permittee needs to clarify information on faults in the text and on the maps in the PAP. (3) Subsurface water inflow associated with fault or fracture systems are possible, however, this potential is not expected to be significant in the Lila Canyon Extension (Page-40, Chapter 6). The Permittee needs to explain the reasons inflow from fractures is expected to be insignificant. (4) As mining progresses down dip, localized fracture systems and faults may contain substantial water. This water is thought to be in place with little or no recharge (Page-41, Chapter 6). The Permittee needs to explain the reasons this water is thought to be in place with little or no recharge. (5) The Permittee needs to reconcile the apparently contradictory statements on Page 40 that water inflow from fractures is expected to be insignificant and on Page 41 that faults may contain substantial water.

R645-301-624.100, 624.110, The Permittee must adequately relate the Sunnyside Fault, other faults, the elevation of the Horse Canyon Mine workings – in particular where the Sunnyside Fault was encountered and water flowed into the Horse Canyon Mine, and other potentiometric, geologic, and hydrologic information relevant to understanding the ground water in the saturated strata of the Blackhawk Formation, and show the relationships on a single map, drawing, or cross section in the PAP.

R645-301-624.100, (1) Much of the Horse Canyon Mine is below the potentiometric surface indicated by the IPA piezometers and the car-dump sump, but water entered the Horse Canyon Mine in large amounts only where the Sunnyside Fault was intercepted in deeper, down-dip areas. Observations of shale in the underlying rock is the explanation for dryness of the mine discussed in the PAP. The Permittee needs to more adequately discuss the reasons why water from the saturated strata did not enter the Horse Canyon Mine and why similar relatively dry conditions are anticipated in the Lila Canyon Extension. (2) The Permittee needs to incorporate permeability values for the Sunnyside Sandstone, published by Balsley in 1981 and referred to in the PHC, into the PAP.

R645-301-121.200, -624.100, Minor water inflows from the exploration entries is anticipated (Page-40, Chapter 6); this reference to exploration entries is unclear and confusing because there are no anticipated exploration entries identified in the Lila Canyon Extension. The Permittee needs to clarify whether this refers to the Geneva tunnel or other exploration entries.

R645-301-121.200, (1) The source of the information on the exploration tunnel and the water in the tunnel, and on the water accumulation known to exist in the faults needs to be discussed with resource information in the PAP. (2) The Permittee makes reference to the Lila Canyon Mine Permit Area (LMPA) throughout Chapter 6. The Division understands this submittal is an extension to the Horse Canyon Mine permit. The Permittee needs to use clear and consistent language in identifying this submittal.

R645-301-121.200, 624.100, 624.130, Saturated strata in the lower Blackhawk Formation are separated from the perched zones in the upper Wasatch Group by upper Blackhawk, Price River and undifferentiated North Horn-Flagstaff Formations Strata that contain approximately 80 percent clays, shales, siltstones, and mudstones (Hydrology, Page-7). The PAP needs to identify the sources of the information on percentage of fine-grained sediments in the stratigraphic column and on swelling clays.

R645-301-624.310, Drill-logs in Appendix 6-1 note that pyrite was visible in many cutting or core samples; although these are not analyses, they are indicators of potential acid- and toxic-forming materials in the strata above and below the

Sunnyside Seam. The PAP makes no mention of these observations of pyrite: the Permittee needs to summarize the information on these logs on the occurrence of pyrite in strata above and beneath the Sunnyside Seam.

R645-301-121.200, 624.230, 731.111, 731.121, Because the PAP uses the Sunnyside Mine as an example of why there is no need to perform further analysis for acid- and toxic-forming materials, the PAP needs to better explain how the handling and disposal of coal mine waste at the Lila Canyon Extension is designed to avoid the acid- and toxic-drainage such as that at the Sunnyside Mine refuse pile.

R645-301-121.200, -624.100, It states on page 11 (Chapter 6) that the portion of the Sunnyside Sandstone which underlies the Lower Seam is "occasionally considered to be a potential aquifer"; the basis or source of this consideration appears to be the ability of this unit to transmit ground water in the Sunnyside area, but this is not clear. The statement itself is unclear and confusing, in particular the meaning of "occasionally considered to be a potential aquifer" in this context. The Permittee needs to clarify and substantiate these statements.

R645-301-623, -624.130, -724.500, -725.200, Resource maps and plans and site specific information are based on, among other sources, the old PAP for the Kaiser South Lease area. The Permittee has a copy of the Kaiser South Lease PAP. Relevant geologic information from the Kaiser South Lease PAP - such as data from the alluvial piezometers - should be incorporated into the Lila Extension PAP, be used in determining the PHC, and be available to the Division to use in preparing the TA and CHIA.

R645-301-622, -624, -722, -724, The Permittee needs to extend information on geology and hydrology, including cross-sections and maps, to include the Range Creek drainage.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and analysis

Baseline samples collected in 1993, 1994, and 1995 (Appendix7-6) were analyzed using the methods in Standard Methods or 40 CFR 136. The Permittee commits that all water-quality analyses performed to meet the requirements of R645-301-723 through -724.300, -724.500, -725 through - 731, and -731.210 through -731.223 will be conducted according to the methodology in the current edition of "Standard Methods for the Examination of Water and Wastewater" or the methodology in 40 CFR Parts 136 and 434. Water-quality sampling will be conducted

according to either methodology listed above when feasible (Section 723).

Ground-water Information

Fluid levels were reported in a number of bore-holes. In several cases, the fluid reported in the bore-hole appears to have been drilling fluid rather than ground water: bore-hole S-26 was completed as a piezometer in August 1980 but was dry within a month of completion and was subsequently cemented to the surface. The occurrence of water in the exploratory borings is not adequately discussed in the PAP.

S-32 was drilled in 1981 in SE1/4SW1/4 Sec. 6, T. 17 S., R. 15 E., south of the Lila Canyon Extension, and completed as a piezometer in the Grassy Member of the Blackhawk Formation. The Permittee has included the drill-log, a Chronology of Development, and Water Pump Tests and Samples in Appendix 6-1 (Section 6.5.1). At least 4 water level measurements and one suite of water-quality analyses were done at S-32, but there is no information on the current condition of S-32 in the PAP.

IPA-1, IPA-2, and IPA-3 were drilled in 1993 and completed as piezometers in 1994. Water-levels were measured from 1994 through 1996, and the Permittee resumed measurements in 2000.

An unsuccessful attempt was made to convert exploratory bore-holes S-26, S-28, and S-31, located south of the Williams Draw Fault, to ground-water observation wells or piezometers. Offsetting shallow piezometers were then bored. A-28, the offset to S-28, also was unsuccessful (Table VI-3). A-26 and A-31 were developed to observe ground water in the alluvium of Little Park Wash. Table VI-3 does not indicate that A-26 and A-31 have been plugged and abandoned; however, the Permittee has no data on them (Section 6.5.1, p. 21) and considers them unusable for ground-water monitoring (Section 724.100).

Two borings described as wells are located in the alluvium of lower Horse Canyon. The one identified as the MDC Well has to the best of the Permittee's knowledge been sealed. The MDC Well is associated with water right 91-185 in Table 7-2. The Horse Canyon Well, nearer the old Horse Canyon Mine surface facilities, is planned to be used by the Permittee during mining and reclamation activities, but it is not clearly associated with a water right and it might merely be a piezometer. Because Horse Canyon is an intermittent drainage with apparently ephemeral flow, water-level and water-quality information from this boring could be valuable in describing the hydrologic balance of the area. The Permittee is proposing to use the Horse Canyon Well as a water-supply well, but knows nothing of the water quality or quantity, or of the availability of water for use. The Permittee needs to determine if the Horse Canyon Well is functional or useful as a well or piezometer and begin monitoring water quality and quantity.

SUWA has raised concerns that extrapolation of the potentiometric surface ignored faults, ignored the car dump, ignores the most recent data, and covers an unacceptably large area for three close data points. The Division notes that it also ignored the postulated ground-water divide described on Page-8 (Chapter 7). In spite of these shortcomings, the approximate

potentiometric surface and the projected water – coal contact on Plate 7-1 give a reasonable approximation of the depth to water in the coal seam and in water-bearing strata above and potentially impacted strata below the coal seam, and this information is sufficient to meet the requirements of the Coal Mining Rules (R645-301-724.100). The Division will evaluate additional information as it is received.

There are no baseline monitoring data in the PAP for L-11-G and L-12-G, two springs shown on Plate 7-4 and discussed in Section 731.211 as ground-water monitoring points. Data are also needed for the springs recently discovered in the unnamed canyon in the southwest corner of the Lila Canyon Extension permit area.

The statement on pages 10-11 (Chapter 7) that there is no discharge from strata above the North Horn is erroneous: the Colton Formation or alluvium lying on Colton produces the largest number of springs, according to the geology and spring location maps in the PAP.

It states on page 11 (Chapter 7) that field conductivity indicates that springs occurring higher in the stratigraphic section have lower conductivity, indicating local flow systems, and refers to Table 7-1: Table 7-1 does not relate electric conductivity to geologic occurrence, and information explicitly relating springs to stratigraphy or lithology is not given anywhere in the PAP.

Regional Aquifer

SUWA has raised several related concerns regarding ground-water:

- that there is a regional aquifer;
- that the regional aquifer is not described,
- that there is no information on the discharge area and discharge rates for the regional aquifer; and
- that UEI has not established that the saturated zone is not an aquifer.

The July 2000 Environmental Assessment (EA) of the Lila Canyon Project prepared by the BLM labels the "coal formation" of the Blackhawk Formation as a regional aquifer, and mentions springs issuing from the Blackhawk at lower elevations within the canyons; however, the 1986 survey of the Horse Canyon area by JBR and the 1993 - 1995 survey of the area around Lila Canyon by EarthFax did not identify any seeps or springs issuing from strata below the upper Price River Formation. Previously unknown seeps have been discovered just recently in an unnamed canyon at the southwest corner of the Lila Canyon Extension area, and the Permittee is initiating monitoring. This intermittent drainage, located east and south of Coleman Wash - mainly in Sections 14, 23, and 26, T. 16 S., R. 14 E., had been identified by Utah DWR as an area where bighorn ewes and lambs congregate, their presence indicating a water supply. The Permittee needs to conduct a survey for springs and seeps in all the draws and washes of the Lila Canyon Extension and adjacent areas, particularly the lower reaches that are incised into the Price River Formation and underlying strata, and needs to evaluate the potential for discharge in

other areas, such as Range Creek.

The coal seams and adjacent strata of the Blackhawk Formation are saturated, at least in the vicinity of the IPA piezometers. The PAP asserts there are no observable discharge points, that there is no use or potential use, nor is the water elemental in preserving the hydrologic balance in the permit and adjacent areas. For these reasons, there is no aquifer in the Mesa Verde Group, which includes the Sunnyside Seam and adjacent strata of the Blackhawk Formation (Hydrology, Page-7). This and similar statements in the PAP need to be reevaluated because of the recent discovery of the seeps in the unnamed canyon at the southwest corner of the Lila Canyon Extension area. The Permittee needs to evaluate whether or not the Sunnyside Seam and related saturated strata are an aquifer - meaning a zone, stratum, or group of strata that can store and transmit water in sufficient quantities for a specific use; and if there is an aquifer, whether it is regional, intermediate, or local in extent.

Lines' model for Range Creek

SUWA has raised concerns that the cross section in Figure 8 in Lines (1985, The ground-water system and possible effects of underground coal mining in the Trail Mountain area, central Utah, USGS Water-Supply Paper 2259) is a model for Range Creek and that it clearly supports discharge to Range Creek from a regional aquifer. The study by Lines provides valuable insight into ground-water systems in the Wasatch Plateau, specifically to the Trail Mountain area. Much of the information can be applied to the Book Cliffs coalfield also.

However, the situation presented diagrammatically in Lines' cross-section differs from the reality of the hydrogeologic environment at Lila Canyon and Range Creek in at least three important aspects: 1). Along its entire course, Range Creek has not eroded deeper than the upper Price River Formation, so a thick section of low-permeability rock isolates the creek from the projected saturated zone; 2). In the reaches nearest Lila Canyon, Range Creek is significantly higher in elevation than water in the saturated strata; and 3). The cross-section in Lines has no scale, but proximity of the stream and saturated coal seam is implied; however, the closest that the Lila Canyon Extension mine workings will be to Range Creek is approximately five miles.

Mine Inflow

Except for water that flowed into the Horse Canyon Mine and was used as part of the coal-mining operation, there has been no diversion of this water for beneficial use (water rights were filed on this in-mine water by IPA: water encountered by mining and used underground is not subject to appropriation through water-rights; water encountered by mining that is brought to the surface for beneficial use is subject to appropriation through water rights). The PAP states that underground water from the saturated zone will probably be encountered and used during development and operation of the mine in the Lila Canyon Extension.

Information on inflow to the Horse Canyon Mine is sparse. Generally, underground flows from rock slopes and gob areas into the Horse Canyon Mine were small. Only when the

mine intercepted the Sunnyside Fault in deeper, down-dip areas was significant water encountered. Prior to suspending operations, the Horse Canyon Mine pumped water from the workings near the Sunnyside Fault to keep them from flooding. Some of the water was used for mine operations, the rest was discharged intermittently to the surface in Horse Canyon. According to sources referenced in Chapter 7, the estimated average discharge rate was 0.2 cfs, but there was no estimate of in-mine consumption.

A large section of the Horse Canyon Mine, including the Geneva exploration tunnel and the rotary dump, is below the potentiometric surface that is indicated on Plate 7-1. It states in the PHC that the Geneva exploration tunnel is flooded, but the source of the information is not given.

Minor water inflow from the exploration entries is anticipated (Page-40, Chapter 6). The PHC (Page 3) states that the exploration tunnel is flooded, that it will be intercepted by mining operations in the Lila Canyon Extension, and the water will need to be pumped from the mine. The exploration tunnel and the water in it are not discussed with resource information and the source of the information is not given in the PAP. Presuming the tunnel or entries mentioned on Page-40 and in the PHC are the same, the PAP states water inflows will be minor, the PHC states pumping will be needed: the source of the information on the Geneva exploration tunnel, and the amount of water known to be in the entries and the amount that will be pumped need clarification and discussion in the PAP.

In-mine flows within the Horse Canyon mine were monitored for quantity and quality at several locations that are shown on Plate 7-1. There are also data from S-32, located to the south of the Lila Canyon Extension area (Appendix 6-1). This information on water in the saturated zone needs to be analyzed and discussed as part of the ground-water baseline description.

The statement about recharge areas and drainage divides on page 8 (Chapter 7) is very unclear. The Permittee has interpreted a ground-water divide in the deep-saturated zone between Horse Canyon and Range Creek and extending between Lila and Little Park drainages; this is not shown on Plate 7-1. If such a divide exists, it indicates water is flowing in different directions in the deep saturated zone. The basis for the interpretation of the existence of this divide and the implications for the potentiometric surface and the hydrologic balance need to be clarified in the PAP.

SUWA has raised concerns that UEI has not described seasonal variation in groundwater – especially with maps or cross sections. The Permittee needs to portray seasonal variations of head on maps or cross-sections.

Baseline Data Adequacy

SUWA has raised concerns that the PAP contains numerous water samples from the mined area of the Horse Canyon Mine that do not represent pre-mining conditions, that the JBR data are not pre-mining, and that the JBR data provide no baseline for the permit area. The Division considers the JBR data as valid pre-disturbance, pre-mining baseline in relation to the

Lila Canyon Extension and as an important part of the required description of the existing, pre-mining hydrologic resources of the permit and adjacent areas. The JBR data alone are not sufficient baseline data, but they are useful and valid baseline data.

SUWA has raised concerns that there are no baseline ground-water monitoring data on the springs to be monitored, and that IPA data are sporadic – not adequate baseline. The Division considers the data collected in 1993, 1994, and 1995 for the springs and 1994, 1995, and 1996 for the piezometers as valid pre-disturbance, pre-mining baseline in relation to the Lila Canyon Extension and as an important part of the required description of the existing, pre-mining hydrologic resources of the permit and adjacent areas. In addition, the PAP contains at least one year of current quarterly baseline data from the springs and piezometers – sufficient for a PAP submittal under the guidelines in the Division's Directive Tech 004.

SUWA has raised concerns that IPA-1 –2, and –3 are the only potential source of information on water quality in the regional aquifer. There is considerable information on ground-water quality and quantity in the analyses of in-mine flows at the Horse Canyon Mine. There are also data from S-32, located to the south. The Permittee needs to include this information as part of the ground-water baseline discussion. The Permittee also needs to consider sampling the IPA piezometers for water-quality analyses.

It states on page 32 (Chapter 7) that there have been no ground-water data collected since 1995. This is incorrect. Data have been collected at designated locations since July 2000. It states on pages 8 and 9 (Chapter 7) that the IPA piezometers have not been monitored since 1996, but monitoring will commence in 2000: these statements need to be made current.

The first page of the 1989 Water Monitoring Data in Appendix 7-2 is illegible, and the Permittee needs to provide a legible copy.

Monitoring - Inside Vs. Outside the Permit Area Boundary

SUWA has raised concerns that fourteen EarthFax data points are within the permit area, but data were collected for only one. During the EarthFax survey in 1993 – 1995, data were collected for all fourteen seeps and springs located inside the permit boundary, which is why their existence is documented in Appendix 7-1. Not every site had flow sufficient to obtain valid water-quality samples: many of the fourteen locations SUWA refers to were no more than wet spots some years, and were dry other years. Where flow was sufficient and consistent, water-quality analyses were done for sites representative of water rights and ground-water discharge zones.

The number of springs monitored on one side or the other of the permit area boundary is not relevant: the permit and adjacent areas are to be monitored, and impacts are to be minimized both inside and outside the permit boundary.

SUWA has raised concerns that five seeps and springs are not sufficient, that four of them are outside the permit, and that one spring in the permit area is not sufficient baseline.

Determination of the permit area is not based on hydrologic systems. The Coal Mining Rules require protection of resources both within and outside the permit area and baseline and operational monitoring of both the permit area and adjacent areas. The Division notes that expanding the permit area to include more springs would actually lower the performance standard for protection of the added springs from; "minimize impact" and "prevent material damage", to simply "minimize impact".

Ground-water Emergence Zones – Groups of Springs and Seeps

SUWA has raised concerns that baseline data need to be collected at all springs and seeps, starting immediately! The Coal Mining Rules require a description of the ground-water hydrologic resources: location; extent; ownership; seasonal quantity and quality; discharge, depth, or usage; and additional information deemed necessary and required by the Division. Baseline data sufficient to make this description are in the PAP. Additional, detailed investigation of every aspect of every component of the hydrologic resources is not needed to describe the resources and minimize impacts, or to comply with the Coal Mining Rules..

Water-quality analyses done by EarthFax were representative of the groups of springs and seeps in the ground-water discharge zones. Springs selected by the Permittee for operational monitoring typically have baseline water-quantity and -quality data from the EarthFax survey, have been developed for use by the water right holder, and have the greatest or most consistent flow of the group. At sites that have been selected for operational monitoring, monitoring was resumed in 2001 to establish a continuous record from pre-mining into operational conditions.

SUWA is asserting additional baseline data are needed for every site, irrespective of use, location, flow, and other existing information about the site and the potential for impacts to the site. Additional baseline monitoring of every point source would provide, at best, marginal information to further describe or define the hydrologic resources of the Lila Canyon Extension. The EarthFax survey was done during a three year period during which the Palmer Hydrologic Drought Index (PHDI) for the region around the Lila Canyon Extension went from wet (1993) to drought (1994) and back to wet (1995). The area is currently in the third year of a drought, so, particularly at this time, repeating baseline monitoring for all the sites that have already been monitored for baseline data would be unlikely to produce additional, useful information.

SUWA has raised concerns that seeps and springs cannot be treated as systems or groups – each source is a separate resource as regards hydrology, wildlife, and vegetation. The survey results from 1993, 1994, and 1995 in Appendix 7-5 document the seasonal, ephemeral nature of individual discharge locations within a ground-water discharge zone or area: discharge appeared at new, previously dry locations and diminished at some older sites during the three years the EarthFax survey was in progress. This is a typical pattern and has been documented throughout the Book Cliffs and Wasatch Plateau coalfields and many other locations. Some monitored sites have been developed by water-right holders to concentrate flow or maintain more consistent flow. The springs selected by the Permittee for monitoring have had relatively consistent flow.

SUWA has raised concerns that L-6-G is adjacent to the Horse Canyon Mine and is not a useful monitoring point. L-6-G is providing pre-disturbance, pre-mining baseline in relation to the Lila Canyon Extension and contributes to the required description of the existing, pre-mining hydrologic resources for the permit and adjacent areas. Because L-6-G has been frequently dry recently, L-11-G, located approximately 100 yards upstream of L-6-G and representative of the same ground-water emergence zone, has been added to the monitoring plan.

Surface Water Information

SUWA has raised concerns that seasonal variation of Lila and Little Park Wash must be shown, and that remote samplers and crest-stage gauges should be used to monitor the intermittent channels. Kaiser installed crest-stage gauges in Little Park (Page 21, Chapter 6) because mine facilities were to be built in or near the channel, so information on flow was important. At this time it is not known whether or not measurements were ever made at these gauges, but any relevant data from the Kaiser South Lease PAP, such as that from the crest-stage gauges, should be included in the Lila Extension PAP to be used in determining the PHC and to be available to the Division to use in preparing the TA and CHIA.

There are no plans for facilities in Little Park Wash, and no facilities are planned for any of the perennial or intermittent channels, so there will be no direct impacts to these drainages. Because flows in drainages in the Lila Canyon area are typically sporadic and flashy, using remote samplers and crest-stage gauges would provide information that would be, at best, marginal or secondary in meeting the requirements listed in R645-301-731.

Channels that drain more than one square mile but have ephemeral flow are included in the intermittent stream definition because the potential flood volumes necessitate application of the stream channel diversion criteria of the Coal Mining Rules. Classification is to be made at the time of permit application, based on collected data and probable conditions, which helps eliminate skewing by data from unusually wet or dry periods (Preamble to the Federal Rules). Several channels in the Horse - Lila Canyon area intermittent by definition, but observations by UEI indicate all surface flow is ephemeral.

Baseline Cumulative Impact Area Information

SUWA has raised concerns that there are insufficient data to prepare the CHIA. Information needed to meet the regulatory requirements of R645-301-725 is available from federal, state, and a number of sources. The Permittee is not required to provide data specifically for the CHIA determination unless none is available from other sources. The Division is not limited to information in the PAP in preparing the CHIA; however, the Division anticipates that data in the PAP will be used along with other information in preparation of the CHIA.

Probable Hydrologic Consequences Determination

Section R645-301-728 of the Coal Mining Rules requires that the PAP contain specific findings. Section 728 of the PAP refers to Appendix 7-3 for many of the findings. Potential

adverse impacts identified in the PHC are: increased sediment loading, diminution or interruption of water supplies on water rights, discharge of contaminated ground water by pumping, erosion and streamflow alteration, and deterioration of water quality (Page-24, Chapter 7). However, the PHC in Appendix 7-3 is written as a narrative that mostly discusses old data and information from the Horse Canyon Mine, and many of the findings are unclear, ambiguous, or very general with no reference to the Lila Canyon Extension. Overall, the PHC is inadequate on many points and a new PHC is needed.

728.300. The PHC determination will include findings on:
728.310. Whether adverse impacts may occur to the hydrologic balance;

SUWA has expressed several concerns that relate to the determination of the PHC, including that there are inadequate baseline data to prepare the PHC and that potential adverse impacts to a regional aquifer and Range Creek have not been addressed in the PHC.

Climatological information on average seasonal precipitation, average direction and velocity of winds, and seasonal temperature ranges that is representative of the permit and adjacent areas is presented in the PAP. Overall, information on geology and hydrology is adequate to prepare the PHC. Additional hydrology information is needed for the canyons incised into the Book Cliffs escarpment, specifically for the seeps recently discovered in the southwest corner of the Lila Canyon Extension area. The PHC determination needs to make use of data collected since 2000 and submitted with the PAP.

An assessment of the probable hydrologic consequences to the Range Creek drainage needs to be added to the PHC to clarify for the public why regional impacts, particularly adverse impacts to Range Creek drainage, are not expected.

728.320. Whether acid-forming or toxic-forming materials are present that could result in the contamination of surface- or ground-water supplies;

SUWA has raised concerns that a finding on acid and toxic materials is needed in the PHC. The PHC determination does not include findings on whether acid-forming or toxic-forming materials are present that could result in the contamination of appropriated surface- or ground-water supplies. This finding needs to be added to the PHC.

728.330. What impact the proposed coal mining and reclamation operation will have on:

728.331. Sediment yield from the disturbed area;

The Permittee states in the PHC that downstream effects from the discharging of water from the mine will be similar to those experienced at the Horse Canyon Mine. A discussion, description, or quantification of what the effects were at the Horse Canyon Mine should be in the PHC determination.

728.332. Acidity, total suspended and dissolved solids and other important water

quality parameters of local impact;

Water will be held in sumps as long as possible to promote settling of sediments, and sampled prior to discharge to ensure compliance with UPDES standards (Page-26, Chapter 7).

Data from the Horse Canyon Mine indicate the main effect of the mine discharge on water quality in the receiving Horse Canyon channel was a decrease in TSS and an increase in TDS. It is not clear what hydrologic resources might be impacted at the Lila Canyon Extension. The PHC needs to include a discussion of the potential adverse impacts to Lila and Coleman Washes and the other drainages.

The springs and stream channels being monitored in the Lila Canyon Extension area are not discussed in the PHC. Current data must be evaluated in determining the PHC. The potential adverse impacts to water-quality and water quantity should be evaluated with respect to water right users and wildlife.

728.333. Flooding or streamflow alteration;

SUWA has raised concerns that there is no baseline characterization of the receiving channel for mine water discharge, against which to compare impacts of discharging to this channel; sedimentation, erosion, and morphology. The PAP contains a commitment to evaluate the channel before water is discharged (Section 728.333). The Permittee needs to determine pre-mine, pre- discharge characteristics of Lila and Coleman Washes.

728.334. Ground-water and surface-water availability;

The springs and stream channels being monitored in the Lila Canyon Extension area are not discussed in the PHC. Current data have not been evaluated in determining the PHC. The probable impacts to water-quality and water quantity are not evaluated with respect to water right users and wildlife.

728.335. Other characteristics as required by the Division;

SUWA has raised concerns that the impacts of increased salinity from the solution of salts from the Mancos Shale are not evaluated: this concern is also addressed in the Tech Memo covering Fish and Wildlife Resource Information. The PHC should address the potential adverse impacts of increasing salinity in the Colorado River from the discharging of water from the mine, and especially how salts dissolved from the Mancos Shale by mine-discharge water might impact the salinity of the Colorado River. This should include a determination of the probability of mine discharge reaching the Price River, and how the proposed operation and reclamations plans will minimize these potential impacts.

728.340. NA

728.350. Whether the UNDERGROUND COAL MINING AND RECLAMATION ACTIVITIES conducted after October 24, 1992 may result in contamination, diminution or interruption of State-appropriated Water in existence within the proposed permit or adjacent areas at the time the application is submitted.

State appropriated water in and adjacent to the proposed permit area is identified in Table 7-2. Some of the appropriated water is within the old workings of the Horse Canyon Mine, other water flows from springs in Horse Canyon and Little Park Wash, particularly along Patmos Ridge. There are also water rights on surface water in Horse Canyon and Little Park Wash. Table 7-2 needs to include water-rights information for the Range Creek drainage.

Findings:

R645-301-722.100, The Permittee needs to portray seasonal variations of head on maps or cross-sections.

R645-301-724, 725, 728, Information from the Kaiser South Lease PAP on the crest-stage gauges and piezometers A-26, A-28, and A-31 in Little Park Wash should be included in the Lila Extension PAP to be used in determining the PHC and to be available to the Division to use in preparing the TA and CHIA.

R645-301-724, 725, 728, Water-quality data for inflows to the Horse Canyon Mine are in the current Horse Canyon Mine MRP, but the Permittee must include this information in the discussion of the saturated zone.

R645-301-722.100, 724.300, It states on page 11 (Chapter 7) that field conductivity indicates springs occurring higher in the stratigraphic section have lower electric conductivity, indicating local flow systems, and refers to Table 7-1: Table 7-1 does not relate conductivity to geologic occurrence, and information explicitly relating springs to stratigraphy or lithology is not given anywhere in the PAP. The Permittee needs to add information substantiating that there is a relationship between position in the stratigraphic section and electric conductivity.

R645-301-724.100, (1) Baseline monitoring data for L-11-G and L-12-G, two springs shown on Plate 7-4 and discussed in Section 731.211 as ground-water monitoring points, need to be added to the PAP. (2) The Permittee must determine if the Horse Canyon Well is functional or useful as a well or piezometer and begin monitoring water quality and quantity. (3) The Permittee needs to consider sampling and analyzing water from the IPA piezometers for baseline water-quality data. (4) In-mine flows within the Horse Canyon mine were monitored for quantity and quality at several locations. There are also data from S-32, located to the south. The Permittee needs to analyze and discuss information on water in the saturated zone as part of the ground-water baseline description. (5) At least four water level measurements and one suite of water-quality analyses were done at S-32, but there is no information on the current condition of S-32 in

the PAP. The permittee needs to visit the site of this water-monitoring well and determine if it is still usable. If it is usable, the Permittee needs to add it to the monitoring plan. (6) The Permittee needs to adequately discuss the occurrence of water in the exploratory bore-holes, as noted on driller's logs (624.210). (7) Minor water inflows from the exploration entries is anticipated (Page-40, Chapter 6). The PHC (Page 3) states that the exploration tunnel is flooded, that it will be intercepted by mining operations in the Lila Canyon Extension, and the water will need to be pumped from the mine. The exploration tunnel and the water in it are not discussed with resource information and the source of the information is not given in the PAP. Presuming the tunnel or entries mentioned on Page-40 and in the PHC are the same, the PAP states water inflows will be minor, the PHC states pumping will be needed. The Permittee needs to clarify and discuss the source of the information on the Geneva tunnel, and the amount of water known to be in the entries and the amount that will be pumped when the Lila Canyon Extension intercepts the tunnel.

R645-301-121.200, (1) The Permittee needs to provide a legible copy of the first page of the 1989 Water Monitoring Data in Appendix 7-2. (3) The statement on pages 10-11 (Chapter 7) that there is no discharge from strata above the North Horn is erroneous: the Colton Formation or alluvium lying on Colton produces the largest number of springs, according to the geology and spring location maps in the PAP. (4) It states on pages 8 and 9 (Chapter 7) that the IPA piezometers have not been monitored since 1996, but monitoring will commence in 2000: this statement needs to be made current. (5) It states on page 12 of Chapter 7 and on page 21 of Chapter 6 that there are no hydrology data for S-32. The Permittee needs to correct these pages - and anywhere else similar statements occur - because hydrology data for S-32, including water-quality data, are in Appendix 6-1.

R645-301-722.100, -624.100, The PAP states that there are no observable discharge points, that there is no use or potential use, nor is the water elemental in preserving the hydrologic balance in the permit and adjacent areas, and that, for these reasons, there is no aquifer in the Mesa Verde Group (Hydrology, Page-7). This and similar statements in the PAP need to be reevaluated because of the discovery of the seeps in the unnamed wash at the southwest corner of the Lila Canyon Extension area. The Permittee needs to evaluate whether or not the Sunnyside Seam and related saturated strata are an aquifer - meaning a zone, stratum, or group of strata that can store and transmit water in sufficient quantities for a specific use; and if there is an aquifer, whether it is regional, local, or intermediate in extent.

R645-301-728, Because concerns have been expressed about hydrologic consequences to Range Creek, the Permittee needs to provide adequate data, including water rights, to make a determination of the probable hydrologic consequences to the Range Creek drainage.

R645-301-721, Previously unknown seeps, in unnamed wash at the southwest corner of the Lila Canyon Extension area, have been discovered just recently and the Permittee is initiating baseline monitoring. The Permittee needs to conduct a survey for springs and seeps in all the draws and washes of the Lila Canyon Extension and adjacent areas, particularly the lower reaches that are incised into the Price River Formation and underlying strata, and the potential for other discharge points in other areas, such as Range Creek, needs to be evaluated.

R645-301-724.310, -121.200, The Permittee has indicated there is a ground-water divide in the deep, saturated zone between Horse Canyon and Range Creek and extending between Lila and Little Park drainages (Hydrology, Page-8). If such a divide exists, it results from movement of ground-water in the deep saturated zone. This divide is not indicated by the potentiometric surface on Plate 7-1 The Permittee needs to clarify the basis for the interpretation of the existence of this divide and the implications for the hydrologic balance.

R645-301-130, On Page-12 (Chapter 7), "(personal communication, 1990)" is given as a reference, but the individual is not identified. The Permittee needs to provide the name of the individual who provided this information.

R645-301-728, (1) The PHC is to contain specific findings. Section 728 refers to Appendix 7-3 for many of the findings; however, the PHC in Appendix 7-3 is written as a narrative that mostly discusses old data and information from the Horse Canyon Mine, and many of the findings are unclear, ambiguous, or very general with no reference to the Lila Canyon Extension. Overall, the PHC is inadequate on many points and a new PHC is needed. The Permittee needs to include an assessment of the probable hydrologic consequences to the Range Creek drainage in the determination of the PHC. (2) The PHC determination does not include findings on whether acid-forming or toxic-forming materials are present that could result in the contamination of surface- or ground-water supplies. The Permittee needs to add this finding to the PHC. (3) The Permittee states that downstream effects from discharging water from the mine will be similar to those experienced at the Horse Canyon Mine. The Permittee needs to discuss, describe, or quantify what the impacts were at the Horse Canyon Mine. (4) An assessment of the probable hydrologic consequences to the Range Creek drainage needs to be added to the PHC to clarify for the public why regional impacts, particularly adverse impacts to Range Creek drainage, are not expected. (5) It is not clear what hydrologic resources might be impacted. The Permittee needs to determine the PHC to Lila , Coleman, and other intermittent washes. (6) The Permittee needs to determine pre-mine, pre- discharge characteristics of Lila Wash. (7) The Permittee needs to discuss in the PHC the springs and stream channels being monitored in the Lila Canyon Extension area. (8) The Permittee needs to evaluate current data in determining the PHC. (9) The Permittee needs to evaluate potential hydrologic impacts to water quality and water quantity with respect to water-right users and wildlife in determining the PHC. (11) In the

PHC, the Permittee needs to address the issue that has been raised concerning increasing salinity in the Colorado River by discharging water from the mine, and especially how salts dissolved from the Mancos Shale by mine-discharge water might impact the salinity of the Colorado River. This should include a determination of the probability of mine discharge reaching Grassy Trail Creek and the Price River. (12) The PHC must include a discussion of potential adverse impacts from infiltration of water from the mine into ground-water.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Coal resource and Geologic Information Maps

Depth to the Sunnyside Seam, the seam to be mined, is shown on the Cover and Structure Map on Plate 6-4. Thickness of the Sunnyside Seam is shown on the Coal Thickness Isopach map on Plate 6-3. Thickness and nature of the Sunnyside Seam, of coal or rider seams above the Sunnyside Seam, and of the stratum immediately below the Sunnyside Seam are shown on the Coal Sections on Plate 6-5. The cross section on Figure 7-1 shows the rock tunnels, the dip of the strata, stratigraphy, and expected ground-water elevation.

Figures VI-1 and VI-2 portray the general stratigraphy of the permit and adjacent areas. Plate 6-1 shows surface geology, including coal crop lines, and the strike and dip of the Sunnyside Seam within the proposed permit area.

Elevation contours on the Sunnyside Seam as determined from the outcrop and bore holes are on Plates 6-2, 6-3, and 6-4. The plates indicate that the coal seam crops out at approximately 6,500 feet in the vicinity of the rock-slope tunnels. The tunnels will intercept the coal seam at approximately 6,300 feet (Appendix 8-2 - Figure 7-1).

Depth of cover ranges from approximately 500 feet near the escarpment to 2,300 feet (Section 525.120 and Plate 5-5). Overburden is, for the most part, around 1,500 feet. Because of the flat topography of Little Park Wash, the deeper coal is generally to the east and north (Section 6.3.)

Fault locations and offsets are shown on Plate 6-1 and discussed in the text. Fault traces are not always visible at the surface, and fault locations on Plates 6-1 and 6-2 are also based on exposures at the outcrop and information from drilling (Geology, Page 27). Interpretations of fault alignments on the geology map in the current Horse Canyon Mine MRP, which are based on detailed mapping by Kaiser Corporation consultants, differ from those mapped by the USGS (Geology, Page 13), and locations of faults on Plates 6-1 and 6-2 are slightly different from those on the geology map in the Horse Canyon Mine MRP and mapped by the USGS. Aside from

differences in detail, these sources of information generally agree on location, extent, and magnitude of the faults; however, as discussed in the Geologic Resource Information section, there is information on faults that needs to be clarified in the PAP.

The Sunnyside Fault, shown on Plates 6-1 and 6-2 of the Lila Canyon PAP and Plate II-2 of the current MRP, limited mining to the east in the Horse Canyon Mine but is not expected to extend into the Lila Canyon area, so is not expected to limit coal recovery at the Lila Canyon Extension.

Maps and cross sections in the PAP extend as far as Patmos Ridge but include only a small portion of the Range Creek drainage. Geologic maps and cross sections need to extend from the Book Cliffs to the Range Creek drainage, at least as far as the channel of Range Creek, to help evaluate potential impacts in the Range Creek

Mine Workings Maps

Plate 5-1 shows the mine workings in and adjacent to the permit area, including the Horse Canyon, the Old Book Cliffs mine and the Lila Canyon project. The DOGM Abandoned Mine Reclamation program inspected the area in and around the Lila Canyon site and found no evidence of underground workings not shown on Plate 5-1.

Monitoring Sampling Location Maps

Elevations and locations of test borings are on Plates 6-2, 6-3, and 6-4. Elevations of core samples are tabulated in Tables VI-1 and VI-3. Piezometers IPA-1, IPA-2, and IPA-3 are shown on Plates 7-1 and 7-4. Elevations and locations of seeps and springs monitored in 1989 by JBR and in 1993-1995 by EarthFax are on Plate 7-1.

Horse Canyon Mine UPDES discharge points UT022926 - 001, - 002, and - 003 (monitored from 1979 to 1991) are on Plates 7-1 and 7-4. Currently monitored UPDES discharge points, UT040013- 001A and - 002A are also shown. Proposed UPDES points L-4-S and L-5-G are on Plate 7-4.

Locations for surface-water monitoring points HCSW-1 (HSW-1, HC-1), HCSW-2, HCSW-3, B-1 (HC-2), and RF-1 are shown on Plate 7-1. Locations for L-1-S, L-2-S, and L-3-S are on Plate 7-4

Subsurface Water Resource Maps

Maps and cross sections in the PAP include only a small portion of the Range Creek drainage. Subsurface water resource maps and cross sections, including those showing water rights, need to be extended at least as far as the channel of Range Creek.

Water-level elevation contours are on Plate 7-1. Seasonal variation in the water levels is tabulated in Appendix 7-1 and 7-2 for the IPA piezometers, but there are no cross sections and

contour maps showing seasonal differences of head.

The MDC Well in NW Section 9 of T. 16 S., R. 14 E., near the road junction, is listed in Table 7-2 - Water Rights. The Horse Canyon Well is located nearer the Horse Canyon Mine surface facilities (Section 722.400). These wells were installed for observation of ground water in the alluvium in Horse Canyon and therefore may have been merely piezometers. They are discussed in Sections 6.5.1 and 724.200 and shown on Plate 7-1.

The ground-water elevation in the Horse Canyon Mine, at the rotary car dump at the intersection of the Main slope and 3rd level, is described in Section 724.100 (page 14); it was approximately 5,800 feet in 1986 and the Permittee states that it probably has remained at this level since operations ceased in the Horse Canyon Mine. This projected ground-water elevation was used in projecting where mining will intercept water, but not in mapping the approximate piezometric surface on Plate 7-1. The location of the dump is described in the text and is shown on Plate 7-1.

Water rights are listed in Table 7-2. The list includes Redden Spring, plus springs identified as Mont, Leslie, Cottonwood, Williams, Kenna, and Pine. In addition, there are eleven unnamed springs listed, plus a well. Locations are on Plate 7-3.

Surface Water Resource Maps

Locations of streams and seeps and springs are shown on Plate 7-1. There are no known perennial streams, lakes or ponds within the permit and adjacent areas. Table 7-2 lists water rights and Plate 7-3 shows locations of these water rights. Text in Section 724.200 refers to Plate 7-1 for the location of Horse Canyon Creek and Lila Canyon drainage and Little Park Wash. Range Creek drainage is mentioned in the PAP, but Range Creek lies several miles east of the Lila Canyon area and is not shown on any of the maps.

Maps and cross sections in the PAP include only a small portion of the Range Creek drainage. Maps and cross sections showing surface water resource, including water rights, need to be extended to include the channel of Range Creek.

Well Maps

Three exploration bore-holes, IPA-1, IPA-2 and IPA-3, were converted to piezometers to monitor water levels in the area. Casing was perforated at the coal seam. Locations are shown on Plate 7-1.

Two borings were done for observation of ground water in the alluvium in Horse Canyon. The MDC Well, which has been sealed, and the Horse Canyon Well located nearer the Horse Canyon Mine surface facilities are shown on Plate 7-1.

One oil exploration hole was drilled south of the proposed Lila Canyon permit area, in Section 25, T. 16 S., R 14 E., SLM, by Forest Oil Company. The location of the hole is shown

on Plate 6-2. According to the Division's records, the well was completed in October 1959. No oil, gas, or water was reported. The well was drilled to a depth of 12,602 feet. It spudded in the Price River Formation and was in that formation to a depth of 370 feet, then passed through the Blackhawk Formation from 370 feet to 906 feet, a thickness of 536 feet.

Exploratory bore-holes S-26, S-28, and S-31, located south of the Williams Draw Fault, were offset with shallow piezometers A-26, A-28, and A-31 intended for ground water in the alluvium of Little Park (Table 6-3). These piezometers have been plugged and abandoned. These piezometers are not shown on Plate 7-1, although they would have been at the approximately the locations shown for S-26, S-28, and S-31 on several maps in the PAP.

Findings:

R645-301-622, -722, Resource maps and cross sections, including those showing geology, hydrology, and water rights, need to be extended at least as far as the channel of Range Creek to help evaluate potential impacts in the Range Creek drainage.

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

General

The Permittee has based the ground-water and surface-water monitoring plans on the PHC determination and the analysis of baseline hydrologic, geologic, and other information in the proposed amendment. The surface- and ground-water monitoring sites will be monitored quarterly through the operational and reclamation periods to document any diminution or damage to the hydrologic balance. Water samples from seeps, springs, and streams will be analyzed for the parameters listed in Tables 7-4 and 7-5. The parameters in Tables 7-4 and 7-5 match the operational parameters in the Division's Directive Tech 004. Monitoring reports will be submitted to the Division at least every three months, within 30 days following the end of each quarter (Section 731.212).

The proposed Lila Canyon Extension includes a commitment to analyze ground- and surface-water samples for baseline parameters preceding each 5-year permit renewal (Section 731.200). These permit-renewal baseline analyses will be done for the surface-water samples

collected at either high or low flow and for the spring samples collected at low flow during that year.

The Permittee's water-monitoring plan is intended to provide data to show impacts to potentially affected springs, seeps, impoundments and drainages within and adjacent to the permit area by comparison with relevant baseline data and with applicable effluent limitations. The Permittee has selected monitoring locations and frequencies, described in Table 7-3, so that significant springs, seeps, impoundments and drainages that could potentially be impacted by the mining and reclamation operations will be monitored on a regular basis (Section 731.222.1).

Ground-water monitoring

Section 731.211 discusses the ground-water monitoring plan. It makes reference to water rights on several of the springs to be monitored. Section 731.212 states that when analyses of ground water indicate non-compliance with permit conditions, the operator will promptly notify the Division and take the actions provided for in (R645-300-)145 and (R645-301-)731: other than following the mine plan, it isn't clear what specific actions these two sections describe. The monitoring plan needs to describe more clearly or specifically how the monitoring information may be used to determine the impacts of mining on the hydrologic balance and what actions will be taken in case water monitoring indicates non-compliance with the permit.

It states on page 32 (Chapter 7) that the springs have not been monitored since 1995: this statement needs to be updated.

No ground-water system underlies the planned surface facilities, which are to be built on fill placed on Mancos Shale, a shale formation several hundred feet thick that greatly restricts vertical and horizontal movement of water (Section 724.100). All potential acid and toxic material will be disposed of in a confined, stable area and covered with at least 4 feet of soil. Contamination of perched ground water in the Price River and Colton Formations is unlikely because the perched zones are several hundred feet above the Lower Sunnyside Coal Seam, and low-permeability strata separate the perched ground-water zones from the coal seam. The perched ground water will not be intercepted by mining activities

SUWA has raised concerns that five seeps and springs are not sufficient, that four of them are outside the permit, and that one spring in the permit area is not sufficient. Determination of the permit area is not based on hydrologic systems. The Coal Mining Rules require protection of resources both within and outside the permit area and baseline and operational monitoring of both the permit area and adjacent areas. The Division notes that expanding the permit area to include more springs would actually lower the performance standard for protection of the added springs from; "minimize impact" and "prevent material damage", to simply "minimize impact".

The seven seeps and springs selected by the Permittee for operational monitoring are representative of the springs and seeps in the ground-water emergence zones located over or adjacent to the area of proposed mining. Additional, detailed investigation of every aspect of

every component of the hydrologic resources is not needed to monitor the resources and minimize impacts, or to comply with the Coal Mining Rules. Springs selected typically have baseline water-quantity and -quality data from the EarthFax survey, have been developed for use by the water right holder, and have the greatest or most consistent flow of the group or zone. Monitoring was resumed at these seven seeps and springs in 2001 to establish a continuous record from pre-mining into operational conditions. Recently discovered seeps in the southwest corner of the Lila Canyon Extension permit area need to be added to the monitoring plan.

Eleven sites are proposed for ground-water monitoring: L-5-G through L-12-G and IPA-1, -2, and -3. These are described in Section 731.211, and except for L-11-G and L-12-G, they are listed in Table 7-3: Table 7-3 needs to be updated. Locations are shown on Plate 7-4. Seeps and springs will be monitored quarterly for parameters listed in Table 7-5. Station L-5-G is the potential mine discharge point and will be monitored in accordance with UPDES Permit requirements. IPA-1, -2, and -3 will be monitored quarterly for depth.

Four springs proposed for operational monitoring are identified by the Permittee as L-7-G, L-8-G, L-9-G (Pine Spring), and L-10-G (William's Draw Spring) correspond with the springs monitored by EarthFax as 9, 10, 16(Z), and 14, respectively.

L-12-G corresponds roughly with EarthFax springs 11 and 12, but does not coincide exactly with either one: the locations of the springs shown on Plate 7-1 in the area around L-12-G need to be confirmed. Appendices 7-1 and 7-6 of the Lila Canyon Significant Revision contain water-quality data on springs 9,10, 14, and 16(Z) from 1993, 1994, and 1995, when they were monitored for baseline for the South Lease by IPA. There are field data on springs 11 and 12 but no water-quality analyses were done. These springs have been monitored since July 2000 by the Permittee, but data are not all in Appendix 7-1 of the PAP.

L-6-G is in the vicinity of Mont Spring, water right 91-617, and Leslie Spring, water right 91-618. These water rights correspond closely to JBR sample sites H-21 and H-19 and are near H-20, H-21A, H- 21B, and H-22; H-18 has been selected by the Permittee as L-6-G to monitor ground water in this area because it is the lowest spring in the stratigraphic sequence. However, this spring has been dry during recent monitoring, so L-11-G has been added to the monitoring plan to supplement or perhaps eventually replace L-6-G.

Spring L-11-G is approximately 100 yards upstream of L-6-G and corresponds with springs H-18A and H-18B. There are no data in the PAP on H-18A and H-18B, but from Plate 7-1, these appear to be the same alluvial water system that was monitored at H-18: this needs to be clarified. This spring also has been recently monitored by the Permittee, but data are not in then PAP.

The spring to be monitored by the Permittee as L -7-G was monitored as 9 (S-9) from 1993 to 1995. Spring 9 is near springs 8, 19-A, and 19-B and has had the most consistent flow of the group. Baseline data for Spring 9 are in Appendices 7-1 and 7-6. Monitoring resumed in July 2000, but all recent data are not in Appendix 7-1. The Permittee identifies Spring 9 as Cottonwood Spring, which is associated with water right 91-2521 in Table 7-2; however, the

location described for water right 91-2521 in Table 7-2 (NE/4 Sec. 13, T. 16 S., R. 14 E.) is probably very general: the designated quarter-section is on a topographic high and there are no identified springs at that location. Water rights 91-399 and 91-2537 are closer to springs 8, 9, 19-A, and 19-B.

A water-monitoring program was implemented in July 2000 to determine if the springs proposed for operational monitoring were still viable and to establish a current baseline that would be continuous with operational monitoring (Chapter 7). L-6-G (H-18, HC-18, EWL-25), L-7-G (9, S-9), L-8-G (10, S10), L-9-G (16, 16Z, S-16), and L-10-G (14, S14) were monitored in July and November 2000 and February 2001, but there was no flow or no access reported for all sites: reports are in Appendix 7-1 of the proposed amendment. Recent data are not in Appendix 7-1. In May 2001, L-10-G was flowing approximately 1 gpm: no water-quality samples were taken.

Baseline water levels for 1994, 1995, and 1996 have been established at three points: IPA-1, IPA2, and IPA3. The MRP contains a commitment to monitor these three piezometers quarterly for water levels. In December 2000, UEI was able to measure the water level in IPA-2, but at IPA-1 and IPA-3 the probe was not able to go far enough into the piezometers to reach water. Water monitoring reports indicate the piezometers were not accessible in February 2001. All three piezometers were successfully measured by UEI on May 15, 2001 and each quarter since. The information is reported in Appendix 7-1.

Map 7-1, based on data from several sources, shows potential ground-water levels and where the Permittee anticipates the mine workings will intercept ground water. The amount of ground water that will actually enter the mine workings depends on the storage capacity of the surrounding formation, the permeability, and type of structure at the mining face. If mine water interception occurs, the water will be stored in sumps and used in the mine and, if necessary, discharged from the mine. Eventually, the three IPA piezometers may be intercepted by the mine, so in addition to the three piezometers, the Permittee commits in Section 731.513 to the monitoring of underground usage and discharge to more accurately define potential impacts on ground water.

Ground-water will be monitored and data will be submitted at least every three months for each monitoring location. Monitoring submittals will include analytical results from each sample taken during the approved reporting period. When the analysis of any ground-water sample indicates noncompliance with the permit conditions, then the operator will promptly notify the Division and immediately take the actions provided for in 145 and 731 (Section 731.212). Ground-water monitoring will continue through mining and reclamation until bond release (Section 731.214).

Equipment, structures and other devices used in conjunction with monitoring the quality of ground water on-site and off-site will be properly installed, maintained and operated and will be removed by the operator and when no longer needed (Section 731.215).

Surface-water monitoring

Section 731.222 discusses the surface-water monitoring plan. The monitoring data will be used to determine the impacts of mining on the hydrologic balance by comparison with relevant baseline data and applicable effluent limitations.

Sediment pond and mine discharges will be monitored monthly or as frequently as discharges occur (Table 7-3). SUWA has raised concerns that there is no UPDES permit. Appendix 7-5 contains a copy of the Permittee's application for a UPDES permit. The UPDES permit was issued in 1999: the PAP should contain a copy of the UPDES permit.

Drainages in the area flow in response to snowmelt and precipitation events. The proposed surface-water monitoring program will monitor the Lila Canyon drainage both above and below the disturbed mine site area at L-1-S, L-2-S, and L-3-S and the sediment pond discharge at L-4-S.

L-1-S, L-2-S, L-3-S, and L-4-S have been monitored monthly since July 2000, and a summary of field observations is in Appendix 7-1. Most reports are no flow. No access was reported for December 2000 and 2001; January and February of 2001; and January, February, and March 2002. The Division and the Permittee need to review the Division's policy on reporting "no access" and revising this monitoring plan if this is truly a problem; once the mine is in operation, access shouldn't be a problem for these sites.

Locations of all monitoring sites are shown on Plate 7-4, "Water Monitoring Location Map." Except for L-11-G and L-12-G, proposed monitoring methods, parameters and frequencies are described in Table 7-3, "Water Monitoring Stations," and Table 7-4, "Water Monitoring Parameters." Monitoring reports will be submitted to the Division at least every 3 months, within 30 days following the end of each quarter. The operational water monitoring plan will be implemented upon approval of the MRP.

The proposed surface-water monitoring plan is detailed in Section 731.220. This plan is based on PHC determination and analysis of all baseline hydrologic, geologic and other information in this permit application. The plan provides for monitoring of parameters that relate to the suitability of the surface water for current and approved postmining land uses and to the objectives for protection of the hydrologic balance as set forth in R645-301- 751 (see Table 7-4).

The BLM originally proposed that the Permittee develop a water-monitoring plan for Range Creek, a perennial stream several miles northwest of the mine, to assess any potential impacts from mining to the perennial stream. The BLM later determined that Range Creek was separated from the mine by several miles, that impacts from mining activities were unlikely, and that it did not have to be monitored for impacts. The Division concurs with the BLM. No monitoring plan has been proposed by the operator for Range Creek. However, in response to comments received from SUWA, the PHC is to be expanded to include Range Creek. If there are indications from the PHC that adverse effects might occur to Range Creek or the Range

Creek drainage, then supplemental information might be required of the Permittee before a decision on the proposed permit can be made.

Discharges of water from this operation will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining promulgated by the Environmental Protection Agency (EPA) set forth in 40 CFR Part 434 (see Sections 731 and 742).

Monitoring reports will be submitted to the Division at least every 3 months, within 30 days following the end of each quarter (Section 731.220). Surface-water monitoring will continue through mining and reclamation until bond release (Section 731.224).

Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of surface water on-site and off-site will be properly installed, maintained and operated and will be removed by the operator when no longer needed (Section 731.225).

Acid and toxic-forming materials

The Permittee has committed to periodic sampling of the materials to be placed in the refuse pile; samples will be collected and analyzed five times during construction of the rock-slope tunnels and from every 6,000 tons of waste rock placed on the refuse pile during mine operation: parameters are in Table 2 of Appendix 5-7. The reclamation plan specifies 4 feet of subsoil and topsoil will be placed over the refuse pile. The slope-rock underground development waste used to build the pads will be left in place for final reclamation and buried with 4 feet of subsoil and topsoil (Chapters 2, 5, and 7, and Appendix 5-7).

The Division requires that the slope-rock underground development waste be disposed of in a refuse pile. At a minimum, the material in the refuse pile must be covered with 4 feet of non-acid and non-toxic forming material. (See Chapters 2, 5, and 7, and Appendix 5-7 for details.)

Coal Mine Waste

Access to the underground workings of the Lila Canyon Mine will be provided by two rock slopes driven upward from the base of the Book Cliffs to the coal seam. Rock that will be removed from the tunnels will be called "slope-rock", and it fits most closely into the classification of underground development waste. The slope-rock underground development waste will contain mostly shale, sandstone, and mudstone. Traces of coal may be found, but the Permittee believes the amount will be insignificant. Slope-rock underground development waste will be used to fill in some low areas to be used as pads (sic.), with any additional being placed in the refuse pile (Section 537.200); this is confusing. The unity and continuity between "low areas to be used as pads" and the refuse storage area need to be clarified.

To ensure surface and ground waters will not be polluted by acid or toxic materials, the underground development waste (slope-rock material) will be examined and tested as necessary

to determine acid- and toxic-forming potential (Section 536 of the plan). In Appendix 5-7, the Permittee commits to take a sample of coal processing waste for every 6,000 tons of waste disposed of in the refuse pile. These samples will be analyzed according to the parameters listed in Table 2 of Appendix 5-7. The Division requires that the underground development waste be disposed of in a refuse pile. At a minimum, the material in the refuse pile must be covered with 4 feet of non-acid and non-toxic forming material. (See Chapters 2, 5, and 7, and Appendix 5-7 for details.)

Coal processing waste from the crusher will be placed in the refuse pile within the permit area. The refuse pile has been designed as a location for the storage of underground development waste that is brought to the surface, including any excess slope-rock underground development waste not used as fill; it is not anticipated by the Permittee that any underground waste other than the slope-rock will be brought to the surface. The capacity of the pile is designed for 150,000 tons, which is in excess of projected needs. Material not transported to the surface, such as overcast material, rock falls, and slope material may be disposed of underground according to the appropriate MSHA regulations. Because this will be an underground mine there will be no spoil.

Transfer of wells

There is no plan to transfer any wells to any other party (731.400).

Discharges into an underground mine

There are no plans to discharge any water into an underground mine.

Gravity discharges

The proposed access portals are below the coal outcrop, as shown on Plates 5-2 and 7-5. The fan is to be located above the outcrop. The two 1,227-foot access tunnels will slope up at approximately 12 percent, from a starting elevation at the surface of approximately 6,150 feet. The intersection of the coal seam and the rock slope will take place at approximately 6,300 feet elevation. Maximum ground-water elevation measured in the three IPA piezometers is 5,975 feet, and maximum projected elevation in the vicinity of the rock-slope tunnels is approximately 6,000 feet (Plate 7-1). Ground-water levels would need to rise approximately 150 feet just to reach the starting elevation of the tunnels at the base of the Book Cliffs (6,150 feet) and approximately 300 feet to reach the intersection of the tunnels with the coal seam (6,300 feet), so it is unlikely water levels will ever reach the intersection of the tunnel and coal seam. It is also unlikely the rock slopes will intercept ground water in the Blackhawk Formation. Therefore, gravity discharge from the mine is unlikely.

Water quality standards and effluent limitations

Water monitoring parameters are shown in Table 7-4. Water monitoring locations and sample frequencies are described in Table 7-3 and on Plate 7-4.

The surface-water monitoring point-source discharge will be conducted in accordance with 40 CFR Parts 122 and 123, R645-301-751 and as required by the Utah Division of Water Quality (UDWQ) for UPDES permits. A UPDES discharge permit has been issued by the UDWQ for the proposed sediment pond and mine water for the Lila Canyon operation.

As indicated in Section 731.220, surface-water monitoring data will be submitted to the Division at least every three months. Discharge monitoring reports will be submitted to UDWQ monthly. When analysis of any surface-water sample indicates non-compliance with the permit conditions, the Permittee will promptly notify the Division and immediately take action to identify the source of the problem, correct the problem and, if necessary, to provide warning to any person whose health and safety is in imminent danger due to the non-compliance.

Casing and sealing of wells

Section 765 does not mention the Horse Canyon Well. If any wells are installed in the future, the requirements of R645-301-765 will be met (765).

Findings:

R645-301-731.211, The Permittee needs to more clearly or specifically describe how the monitoring information will be used to determine the impacts of mining on the hydrologic balance and what actions will be taken in case water monitoring indicates non-compliance with the permit.

R645-301-121.200, The Permittee needs to update the statement on Page 32 (Chapter 7) that the springs have not been monitored since 1995.

R645-301-751, -731.200, The Permittee needs to include a copy of the UPDES permit, which was issued in 1999, in the PAP.

R645-301-724, -731.200, Spring L-11-G is approximately 100 yards upstream of L-6-G and corresponds roughly with springs H-18A and H-18B on Plate 7-1. There are no data in the PAP on H-18A and H-18B, but from Plate 7-1, these appear to be the same alluvial water system that was monitored at H-18. The Permittee needs to clarify the nature of L-12-G and its relationship to L-6-G, H-18, H-18A, and H-18B.

R645-301-724, -731.200, The Permittee needs to update Table 7-3 to include L-11-G and L-12-G.

R645-301-724, -731.200, The Permittee needs to add water-monitoring data from the monitoring program implemented in July 2000, including L-11-G and L-12-G, to the PAP.

R645-301-724, -731.200, The Permittee needs to add data collected at L-11-G and L-12-G to the PAP.

R645-301-731.400, -765, The Permittee needs to discuss transfer and permanent casing and sealing of the Horse Canyon Well in Horse Canyon.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Monitoring and sample location maps

Operational ground-water and surface-water monitoring sites are listed in Table 7-3, and locations are shown on Plate 7-4. The proposed surface-water monitoring program was established to collect data around the Lila Canyon Mine both above and below the disturbed site at L-1-S, L-2-S, and L-3-S. The sedimentation pond discharge point, L-4-S, and the potential mine discharge point, L-5-S, will be monitored in accordance with UPDES permit requirements. Current UPDES discharge points UT040013-001A and -002A are also shown on Plate 7-4. Locations of seep and spring ground-water monitoring sites L-6-G through L-12-G and piezometers IPA-1, -2, and -3 are shown on Plate 7-4.

Findings:

The Permittee met the minimum requirements for maps, plans and cross sections of mining operations of the Coal Mining Rules.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Ground-water monitoring

Ground-water monitoring will continue through mine operation and reclamation until

bond release (Section 731.214). The same ground-water monitoring plan will be used during mine operation and reclamation. Parameters are listed in Table 7-5.

Surface-water monitoring

Surface-water monitoring will continue through mine operation and reclamation until bond release (Section 731.224). Locations, parameters, and sampling frequency (other than UPDES discharge points) may be modified by the Division or by the Permittee with the approval of the Division. Parameters are listed in Table 7-4.

Acid and toxic-forming materials

To ensure surface and ground waters will not be polluted by acid or toxic materials, the underground development waste (slope-rock material) will be examined and tested as necessary to determine acid- and toxic-forming potential (Section 536 of the plan). In Appendix 5-7, the Permittee commits to take a sample of coal processing waste for every 6,000 tons of waste disposed of in the refuse pile. These samples will be analyzed according to the parameters listed in Table 2 of Appendix 5-7. The Division requires that the underground development waste be disposed of in a refuse pile. At a minimum, the material in the refuse pile must be covered with 4 feet of non-acid and non-toxic forming material. The reclamation plan specifies 4 feet of subsoil and topsoil will be placed over the refuse pile. The slope-rock underground development waste will be left in place for final reclamation and buried with 4 feet of subsoil and topsoil (Chapters 2, 5, and 7, and Appendix 5-7).

The Division does not expect an acid mine drainage problem to occur at the Lila Canyon Mine because refuse will be disposed of on high ground, and the refuse will be mounded and buried below four feet of growth medium. With low precipitation and four feet of soil cover, there will be limited contact of water with the refuse.

Transfer of wells

There is no plan to transfer any wells to any other party (731.400).

Discharges into an underground mine

The Permittee has not proposed any discharges into an underground mine.

Gravity discharges

Section 731.520 explains why gravity discharges from the mine are not expected, before or after mine closure. The coal seam to be mined dips away from the portal site at approximately 12 percent. If water is encountered in the mining, it will likely be at a static level far below the exposed outcrop or rock slopes. It is unlikely water levels will ever reach the intersection of the tunnel and coal seam, so gravity discharge from the surface entries is also unlikely.

Water quality standards and effluent limitations

Water monitoring, both surface and ground water, will continue until bond release. Water monitoring data will be submitted every three months for each monitoring location. Should analysis of any sample indicate non-compliance with permit conditions, the Permittee will notify the Division and take immediate steps to correct the problem, and, if necessary, provide notice to anyone whose health or safety is in imminent danger due to non-compliance.

Findings:

The PAP meets the minimum requirements of the Coal Mining Rules for reclamation hydrologic information.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

SUWA has raised concerns that the regional aquifer is not covered in the CHIA. The CHIA for this submittal has not been prepared yet.

SUWA has raised concerns that there are insufficient data to prepare the CHIA. Data are available from federal, state, and a number of sources. The Permittee is not required to provide data unless none is available from other sources. The Division is not limited to information in the PAP in preparing the CHIA; however, it is anticipated that data in the PAP will undoubtedly be used along with other information in preparation of the CHIA.

SUWA has raised concerns that the discharge area for the regional aquifer is not identified. The potential for discharge from a regional aquifer will be considered in the CHIA.

The Division will provide an assessment of the probable cumulative hydrologic impacts (CHIA) of the proposed operation, and all anticipated mining, upon surface- and ground-water systems in the cumulative impact area. The CHIA will be sufficient to determine, for purposes of permit approval, whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The Division will use data and analyses from several sources, including those submitted by the Permittee in the Lila Canyon Extension PAP.

RECOMMENDATIONS:

The permit for the Lila Canyon Extension should not be approved until the deficiencies stated above have been satisfactorily addressed.